Paper No. 18

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

_____

Ex parte SHIH-CHIANG YU

_____

Appeal No. 95-2665
Application 07/999,609[1]

_____

ON BRIEF

_____

Before CALVERT, THOMAS, and TORCZON, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellant has appealed to the Board from the examiner's final rejection of claims 5-18, which constitute all the claims in the application.

[1] Application for patent filed December 31, 1992.

Representative claim 5 is reproduced below:

5. A non-volatile semiconductor memory cell comprising:

a semiconductor substrate;

a source having a first portion and a second portion therein formed in said semiconductor substrate;

a drain formed in said semiconductor substrate spaced from said source;

a channel including a first portion, a second portion, and a third portion therein disposed between said drain and said source, said channel having a conductivity;

an elongated Y-control trace dielectrically disposed atop said third portion of said channel and said first portion of said source;

an elongated X-control trace dielectrically disposed atop said Y-control trace and substantially perpendicular therewith; said X-control trace having a portion thereof dielectrically disposed atop said first portion of said channel; and

a floating gate having a first segment thereof dielectrically disposed between said X-control and Y-control traces, a second segment thereof dielectrically disposed atop said second portion of said channel, and a third portion thereof dielectrically disposed atop said second portion of said source;

wherein when said X-control and Y-control traces are substantially simultaneously positively energized, electrical charges are couplingly induced in said floating gate from said channel by source side injection effect allowing said floating gate to couplingly vary the conductivity of said channel after de-energization of said control traces, thereby enabling the non-volatile memory cell to be programmable, and wherein when said X-control and Y-control traces are substantially simultaneously negatively energized, electrical charges are couplingly induced out of said floating gate to said source by

Fowler-Nordheim tunneling effect allowing said floating gate to couplingly vary the conductivity of said channel after de-energization of said control traces, thereby enabling the non-volatile memory cell to be deprogrammable.

The following references are relied on by the examiner:

Arima et al. (Arima)	5,101,250	Mar. 31, 1992
Guterman	5,153,691	Oct. 6, 1992
Ma et al. (Ma)	5,280,446 (effective filing date Sep. 20, 1990)	Jan. 18, 1994
Komori et al. (Komori) (Japanese Kokai)	61-144878[2]	July 2, 1986
Hasunuma (Japanese Kokai)	61-216482[2]	Sep. 26, 1986

Claims 5-18 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Guterman in view of Hasunuma, further in view of Komori and Ma as to claims 5, 6 and 8-16, with the addition of Arima as to claims 7, 17 and 18. An outstanding rejection of certain claims under the second paragraph of 35 U.S.C. § 112 from the final rejection was not repeated in the answer. Therefore, it is not before us.

[2] Our understanding of these two references is based upon translations provided by the Scientific and Technical Information Center of the Patent and Trademark Office. Copies of these translations are enclosed with this opinion. Because of the dates of the translations, it appears that the examiner obtained translations in preparation of the Examiner's Answer, which quotes-in-part from translation pages. The file record is not clear if appellant has been supplied copies of the translations. Therefore, we are supplying copies as attachments to this opinion.

The file record indicates that after the examiner's initial reliance upon Ma, which has a filing date of June 8, 1992, appellant filed an affidavit under 37 CFR § 1.131. The Advisory Action issued on May 6, 1994, explains the examiner's non-acceptance of the evidence provided by this affidavit and in turn relies upon the effective filing date of September 20, 1990 as the basis for the rejection. Since there have been no subsequent submissions to correct any and all deficiencies with respect to the § 131 affidavit and/or any additional challenges by appellant as to the findings of the examiner in this Advisory Action in the brief or reply brief, we consider this a settled issue.

Rather than repeat the positions of the appellant and the examiner, reference is made to the briefs and the answer for the respect details thereof.

OPINION

We reverse all rejections under 35 U.S.C. § 103.

The examiner's statement of the rejection is essentially set forth in its basic form at pages 3 through 6 of the answer and amplified at pages 8-10 thereof, both of which assert the combinability of the teachings and suggestions of Guterman, Hasunuma, Komori and Ma. The examiner's approach is to utilize

Guterman as a basic or starting-point reference which is asserted to teach representative independent claim 5 on appeal except for certain identified features at page 4 of the answer. Each of the respective other references is discussed in detail extensively with the approach to justify the obviousness of modifying Guterman to account for the claimed differences between his teachings and that which is set forth in representative independent claim 5 on appeal.

The reasoning of the examiner at pages 4-6 of the answer is difficult to follow and does not appear to us to take a prospective look at the teachings and/or suggestions of each and all of the references relied upon but, in fact, appears to us to look at them in prohibitive hindsight using claim 5 to guide the examiner in a combinability-type reasoning process. This is the initial argued position of the appellant in the principal brief on appeal. Thus, we tend to agree with appellant that there has been a selective picking and choosing by the examiner of the various features of the representative prior art relied upon to arrive at the claimed invention. We also conclude that the examiner essentially therefore has not set forth a prima facie case of obviousness.

We are mindful of the teaching of Komori at page 11 of the translation that indicates that source side injection is strongly preferred as a programming approach in floating gate memory devices because of its increased efficiency over the drain side injection approaches of the prior art. This is confirmed by the comparable teaching in Ma in the paragraph bridging columns 4 and 5 of this reference, a portion relied upon by the examiner. This is a positively recited limitation in independent claim 5 and one which is inferred in independent claim 14 on appeal. However, we are left at a loss as to determine why the artisan would have chosen, from the prior art relied on, the specifically recited Fowler-Nordheim tunneling effect approach in independent claim 5 on appeal (and impliedly recited in independent claim 14 on appeal) as a deprogramming technique and to do so through the source as recited in both independent claims 5 and 14 on appeal.

Each of independent claims 5, 8, 9 and 14 recite in various degrees of specificity a certain overlappedness of certain portions and/or regions of structure recited among each other in each of these respective claims. The examiner's rationale attempts to extend and/or modify the teachings of the overlap-pedness of the structure Figure 1 of Guterman based upon the teachings of the secondary references. However, we remain

unconvinced that the artisan would have done so from the rationales expressed by the examiner and/or the teachings of each of these references.

This indirectly relates to the argued position from appellant that a three transistor structure is disclosed. It may be disputed as to the detail in which this feature is indirectly recited in each independent claim on appeal, yet Guterman does set forth an equivalent three transistor structure in Figures 1-2. This is the only reference from which we can clearly discern that a three transistor structure is taught and/or suggested. The other references appear to teach either one and/or two transistors. This is critical to an understanding of the overall structure of each independent claim on appeal as a starting point because the simultaneity of the accessibility of each cell in the functional wherein clause is based upon the substantial simultaneous energization of the claimed first and second traces. As dis-closed, this activates the middle transistor in representative Figure 5 of the disclosed invention. This we are urged would be done effectively in Guterman, but we remain unconvinced of the simultaneity in that reference alone even as modified by the single and/or double transistor teachings in Hasunuma, Komori and Ma.

Although the charging of the floating gate from the substrate and the discharging of the floating gate into the substrate in the wherein clause at the end of independent claim 9 on appeal is relatively broadly recited and therefore encompasses any and all programming and/or deprogramming approaches from the prior art either admitted by appellant at specification page 1 or represented by the references relied upon by the examiner, we remain unconvinced of the obviousness of physically extending the second control trace on top of the first control trace of Guterman to reach even independent claims 8 and 9 on appeal. In other words, we are left at a loss as to determine why the artisan would have extended the erase electrode 130 over the programming electrode 110 in Figure 1 of Guterman based upon the teachings and suggestions and line of reasoning of the examiner as to Hasunuma, Komori and Ma.

Page 6 of the Reply Brief raises two questions which have not been answered by the examiner in any supplemental answer. We are unable to answer them ourselves. The first question relates to the substance of the last paragraph of this opinion. Appellant again asserts that Guterman teaches away from doing so as set forth in the original pages of the brief, which portion

is not answered by the examiner in a persuasive manner in the responsive arguments portion of the answer. The second question at page 6 of the reply brief relates to Ma and its alleged failure to address the simultaneous energization of both control traces, a feature we also discussed earlier in this opinion.

Thus, the examiner appears to have failed to address the substantive arguments raised by appellant in the brief and reply brief as to certain claimed features and/or certain deficiencies in the prior art relied upon. In order for us to sustain the examiner's rejections under 35 U.S.C. § 103, we would need to resort to speculation or unfounded assumptions to supply deficiencies in the factual basis of the rejections. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968), reh'g denied, 390 U.S. 1000 (1968). This we decline to do. We cannot independently agree with the motivation or rationale expressed by the examiner as a basis to combine the respective teachings or suggestions of the prior art relied upon to arrive at the claimed invention. Arima, as argued, appears cumulative as to certain teachings over the other

references relied on and does not appear to cure the noted deficiencies in the examiner's positions[3].

In view of the foregoing, the decision of the examiner rejecting claims 5-18 under 35 U.S.C. § 103 is reversed.

REVERSED

IAN A. CALVERT Administrative Patent Judge	)	
JAMES D. THOMAS Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
RICHARD TORCZON Administrative Patent Judge	)	

[3] From our study of the claims, we note the following in passing. The "first portion" in claim 7, line 3, should probably be --second portion-- to agree with claim 18, Figure 4b and specification pages 10 and 11.

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